Southern Resident killer whales: from captivity to conservation

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Colleen Weiler, Rob Lott, Erich Hoyt, Deborah Giles, Howard Garrett, Susan Berta, Rein Attemann, Giulia Good-Stefani, and Francine Kershaw
Southern Resident Killer Whales: From Captivity to Conservation

Coauthor: Rob Lott

ABSTRACT

The endangered Southern Resident killer whale (Orcinus Orca) (SRKW) population remains the only killer whale population listed under the United States Endangered Species Act in U.S. waters since it was added in 2005. In the 1960s and 70s, the population was reduced by approximately 40% following intensive efforts to capture individuals for a growing marine park captivity industry. The first Northwest killer whale census (1974) found just 70 remaining individuals in the SRKW community. This population has struggled to return to pre-capture numbers, and in the face of new threats including prey depletion, toxic contamination and vessel effects, fewer than 80 individuals remain today. Over the last 40 years, this unique killer whale community has transitioned from targets of the captivity industry to one of the most iconic wild species of the Pacific Northwest, but is now desperately in need of meaningful and effective conservation efforts. As threats to this population have changed, environmental and advocacy groups have revised their strategies from a focus on separate issues to a recognition of the need for an ecosystem approach to ensure the long-term recovery and survival of these iconic killer whales. Recent research indicates that ecosystem-based efforts drive quicker recovery of ecosystems and endangered species. This innovative method has led to new partnerships with groups from disparate backgrounds working together to address multiple issues in the Pacific Northwest to recover the SRKWs and their habitat – in particular addressing the threat of prey depletion for the SRKWs by working for salmon restoration. By focusing on the role of whales in the ecosystem and their needs, we can increase conservation efforts for the SRKWs and demonstrate the potential of ecosystem-based management.

SOUTHERN RESIDENT KILLER WHALES

The Legacy of Captivity

Between 1962 and 1977, at least 275 (up to 307) killer whales were captured in the waters off Washington State and British Columbia. At least 47 individual SRKWs were sold to marine parks or died during the capture effort - approximately 40% of their population. Juveniles were disproportionately targeted, effectively removing an entire generation. From an estimated historic size of more than 900 whales, the SRKWs had just 70 individuals in 1974.

The Rise of Modern Threats

While capture efforts directly decreased the SRKW population, new threats to their survival emerged. The cumulative impact of these threats causes a negative feedback loop, further impeding recovery and increasing stress. A lack of prey causes individuals to metabolize fat, releasing stored contaminants and compromising reproductive and immune systems. Research indicates that about 69% of adult pregnancies were lost due to stress; other studies have found correlations between declining salmon stocks and high SRKW mortality rates.

The Salmon Issue

- Chinook salmon have declined dramatically throughout the Pacific Northwest. The major river systems utilized by the SRKWs include the Fraser River, Puget Sound, Columbia/Snake, Klamath, and Kootenai Valleys.
- Salmon have been decimated by the four H's: hydrography, harvest, habitat loss, and hatchery effects. dams have a significant impact on salmon populations by blocking migration routes, degrading habitat, and altering the flow of rivers.
- British Columbia salmon stocks are estimated to be 1/2 of their historic size. Puget Sound stocks A and Columbia River stocks.

The Orca Salmon Alliance

- An alliance of research and advocacy groups working together to address the decline of SRKWs and salmon in the PNW by protecting the entire ecosystem.
- Focuses on the interactions and connections between ecosystem elements and offers a new perspective on conservation issues.
- Encourages new partnerships and collaborative efforts between scientists, advocates, managers, and policy-makers.
- Works to increase knowledge and improve communication about the threats that are facing new opportunities for involvement.
- Creates public knowledge and engagement in an ecosystem.

Ecosystem-based Recovery

Ecosystems are complex, and recovery requires a holistic approach based in environmental knowledge, with collaborative and partnership-based approaches between agencies and sectors, public education and involvement, connections between scientific and policy, and adaptive management. Isolated, single-issue management does not address the source of threats and does not contribute to long-term survival.

Endangered Species Act: “The purposes of this Act are to provide a means by which the unlink of threatened species and threatened species may be conserved…” (ESA section 2(b))

Marine Mammal Protection Act: efforts should be made to protect essential habitats, from the adverse effects of human actions (MMPA section 3(i))

US Commission of Ocean Policy: “A comprehensive and coordinated national ocean policy requires moving away from the current fragmented, single-issue way of doing business and toward ecosystem-based management.”

Southern Resident killer whale population count by year (Center for Whale Research)

Ecosystem approach to endangered species recovery:

- Recognize and address cumulative impacts.
- Research indicates that restoring predators and prey species together is almost always more efficient than sequential recovery. The sequence of restoration matters when one target is eaten by another. “Strengthened recovery” may be the result of predator-prey approaches in which specialist predators do not have access to a readily available and abundant prey source. (Orem et al. 2017)
- Habitat restoration benefits salmon and helps to reduce toxin loads.
- Critical habitat designation creates the “umbrella effect” of additional protections for important prey species.
- Ecosystem recovery is necessary to ensure long-term survival of the SRKWs, but their decline and critical status requires EBM to be paired with short-term, immediate impact actions.

Ecosystem-based management:

- Immediate measures to improve salmon survival: spill, floods, sediment and local availability, and contaminant exposure to wild salmon populations (habitat, long-term dam operations).
- Interagency and transboundary cooperation to address salmon, habitat, and pollution.
- Apply research to developing concrete actions through adaptive management.
- Expand critical habitat and identify essential habitat features.
- Increase buying point and non-point source pollution.
- Develop and enact measurable, ecologically relevant noise reduction goals.

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